Subject Index

A

Accounting; *see also* Financing, Records
depreciation; basis for, 1673
of cast-iron mains related to service life, 795
use and abuse of, 1647
records coordinated with operating system records, 225
supervision of, by public service commission in Wisconsin, 917
Acidity; controlled by flow augmentation, 1877
Activated carbon; handling and feeding at Detroit, 621
use in purification plants, 609
granular; use at Bay City, Mich., 593
Administration; *see also* Management
of sewer rentals, 1685
Akron, Ohio; water supply and system, management of, 1775
Algae control; at Appleton, Wis., 1165
in surface supplies in Michigan, 2056
American Water Works Association;
committee reports; progress report of American Research Committee on Grounding, 1946
recommended practice for distribution system records, 181
water treatment and laboratory control, 1507
water works practice, 502
membership list, *a supplement to the July issue*
present attitude on grounding of electrical installations, 1940
report of audit of association funds for 1939, 516
report of the 1940 Convention, 2099
report of the 1940 section meetings, 2111
standard specifications; for fire hydrants for ordinary water works service, *a section of the August issue*
tentative specifications; for cement mortar protective coatings for steel pipe, 30 inches and over, *a section of the January issue*
for coal-tar enamel protective coatings for steel pipe, 4½ to 30 inches, *a section of the January issue*
for coal-tar enamel protective coatings for steel pipe, 30 inches and over, *a section of the January issue*
for electric fusion welded steel water pipe, 30 inches and over, *a section of the January issue*
for elevated steel water tanks, standpipes and reservoirs, *a section of the December issue*
for lock-bar pipe, *a section of the January issue*
for riveted steel pipe, *a section of the January issue*
for steel water pipe of sizes of 4 inches up to but not including 30 inches, *a section of the June issue*
Ammonia; effect of, on germicidal efficiency of chlorine in neutral solutions, 1904
treatment with, at Indianapolis, 1155
aqueous; use in purification, 1129
Analysis; *see also* Bacteriology, Quality
calcium, rapid determination of, with motorized apparatus, 279
cyanide, determination of, in small amounts, 487
flow; *see* Hydraulics
magnesium, rapid determination of, with motorized apparatus, 279
manganese; in impounding reservoir, 2018
phenol, determination of minute amounts, in water containing sodium sulfide, 1038

Anderson, Ind.; break-point chlorination at, 1027
Ann Arbor, Mich.; development of water supply at, 1577
operation of water softening plant in, 1600
water softening plant construction in, 1587
Apparatus; concentrator for solids in filter effluent, 1528
electrical; for easy location of cross-connections, 1999
motorized; for rapid determination of calcium and magnesium, 279
underwater cutting tool for aquatic plants, 1883
Appleton, Wis.; control of algae at, 1165
Aqueous ammonia; *see* Ammonia, aqueous
Arlington, Va.; laboratory control and sampling in the distribution system at, 652
Atlanta, Ga.; results of tests on effect of interior lining on water quality at, 1547

B

Bacterial pollution; *see* Pollution, bacterial
Bacteriology; *see also* Analysis, Quality
calculation of most probable numbers in coli-aerogenes analyses, 478
depreciation of quality in distribution systems, 1501
induced slow lactose fermentation in *Esch. coli*, 659
detection of coliform organisms in Minnesota, 98
Baltimore, Md.; manganese in supply of, from Loch Raven Reservoir, 2016
Bay City, Mich.; use of granular activated carbon at, 593
Break-point chlorination; *see* Super-chlorination
Buffalo; effect of sewage treatment on bacterial pollution of Niagara River, 1529
sewer rental financing in, 634

C

Calcium; rapid determination of, by motorized apparatus, 279
hypochlorite; in purification, 1517
Calgon; *see* Sodium hexametaphosphate
California, Southern; softening and filtration plant in, 1
sludge disposal in, 1127
Carbon, activated; *see* Activated carbon
Carbonaceous zeolites; *see* Softening
Cast-iron mains; *see* Mains, cast-iron
Cathodic protection; of steel water tanks, 1069, 1075
on domestic distribution system at Treasure Island, 305
use of paint with, 1079
Cement mortar; used in lining cast-iron mains, 819
Certification; *see* Personnel
Charleston, S. C.; lining mains in position at, 819
Charlotte, N. C.; equipment replacement at, 1693
Chemical feeders; history of, 1886
need for specifications for, 1892
gravimetric; advantages of, 1890
solution; types of, 1891
volumetric; inadequacy of, 1889
Chemistry; *see* Analysis
Chicago; sludge disposal problem in, 1127
stock yards fire in, 1842
world's largest filtration plant in, 1359, 1377
Chloramine; *see* Ammonia, Chlorine
Chlorination; *see also* De-chlorination, Super-chlorination
break-point; *see* Super-chlorination
photo-cell control of, 859
Chlorine; alternate popularity with calcium hypochlorite in purification, 1519
developments in use of, 1123
germicidal efficiency of, affected by ammonia, 1904
Cincinnati, Ohio; possible uses of Ohio Conservancy Act in, to develop and operate water and sewerage facilities, 570
Cleveland, Ohio; possible uses of Ohio

Conservancy Act in, to develop and operate water and sewerage facilities, 570
public service in, as reported by an engineer, 945
Coagulation; *see also* Filtration, Flocculation
studies on, 1124
fractionated; new procedure of, 742
Coal-tar enamel coatings; *see* Coatings, coal-tar enamel
Coatings; *see also* Lining
cement mortar; for steel pipe, 30 inches and over, tentative specifications for, *a section of the January issue*
coal-tar enamel; for steel pipe, 4½ to 30 inches, tentative specifications for, *a section of the January issue*
for steel pipe, 30 inches and over, tentative specifications for, *a section of the January issue*
discussion of specifications, 1706
in steel pipe protection, 1387
service life of, 1705
concrete; for underground piping, 1723
protective; for steel pipe, 1385
Coli-aerogenes; *see* Bacteriology
Coliform organisms; *see* Bacteriology
Colorado; law on water and sewerage districts, 62
Colorado Springs, Colo.; new high pressure steel water supply line in, 1225
Combination; of municipal utilities, advantages of, 1435
Combustion, submerged; for recarbonation, 93
Commission management; *see* Management, commission
Committee reports; *see* American Water Works Association
Concentrator; for solids in filter effluent, 1528
Concrete coatings; *see* Coatings, concrete
Conditioning; new plants in Michigan, 2053
novel design features of Lansing plant, 1259
Conductivity measurements; use and limitations of, in determining well water quality, 675
Conservation; effect of multiple use of watershed on, 1024
Construction; legal decisions regarding, 1089
Control; *see also* Laboratory control
maintenance of, 423
plant; as affected by stream pollution, 576
necessity for tightening, in purification, 1118
Copper sulfate; treatment with, at Indianapolis, 1155
Corrosion; *see also* Tuberculation
control of; by cathodic protection, in steel tanks, 1069, 1075
by sodium hexametaphosphate, 1484, 1495, 1498
methods for, 387, 394
corrective measures in, 1125
electrolysis; in new pipe lines, 2058
of consumer's plumbing, 408
of services, related to grounding of electrical installations, 1946
problems of, 401
soil; in Florida, 1723
Cross-connections; between domestic and fire lines pollute drinking water supply, 2006
location of, simple method for, 1998
present status of control, 1737
types of, 1997
Crustacea; control of, in surface supplies of Michigan, 2056
Curb boxes; ownership and maintenance of, 1848
Customer service; *see* Public relations
Cutting tool, underwater; for aquatic plants, 1883
Cyanide; determination of small amounts, 487

D

Dallas, Tex.; taste and odor control at, 613
water and sewer service in, directed by radio, 2067
De-chlorination; *see also* Super-chlorination
for control of iron and sulfur organisms, 1137
with ferrous sulfate, 1176

Deep wells; *see* Wells, deep
Defense, community; organizing for, 1732
Denison, Tex.; replacement of pumps at, 1691
Depreciation; *see* Accounting
Design; cast-iron pipe; new method for, applied at Wichita, Kan., 1321
distribution reservoir; in San Francisco, 1819
plant; for water conditioning at Lansing, 1259
sedimentation basin, 1131
Detroit; customer service bureau in, 1446
handling and feeding activated carbon in, 621
in-service training for personnel of customer service bureau in, 1451
Disease; *see also* Health
averted in pollution of Island, 2006
gastro-enteritis; outbreak traced to painting of water tank, 1928
typhoid; in large cities of U. S. in 1939, 1394
Distribution systems; *see also* Mains, Pipes, Services, Tanks
bacterial depreciation of quality in, 1501
cathodic protection of, at Treasure Island, 305
hydraulic analysis of; in Edmonton, 2038
legal decisions relating to defects in, 1081
maintaining service through, in sub-zero weather, 2060
records; 255
recommended practice for, 181
relation to fire protection of, 1838
reservoirs; capacity requirements and design of, 1819
sampling and laboratory control, importance of, 649
Drinking fountain; photo-electric cell control of, in Indianapolis, 1884

E

Edmonton, Alta., Canada; analysis of distribution system in, 2038
Education; working model of a filtration system used in high school, 1975
Efficiency; *see* Management, Pumps
Electricity; *see* Apparatus, Grounding
Electrolysis; *see* Corrosion
Elgin, Ill.; profits by metering low flows, 1107
Employees; *see* Personnel
Equipment; *see also* Accounting, Financing
program for replacement of, 1689
radio; for maintenance trucks, 2068
rating of, as part of approval system, 1988
relation of department records to, 247
Esch. coli; see Bacteriology
Everglades, Fla.; concrete coating to prevent soil corrosion at, 1723

F

Fairhaven, Mass.; corrosion control by sodium hexametaphosphate in, 1484
Fermentation; induced slow lactose, in *Esch. coli*, 659
Ferrous sulfate; de-chlorination with, after super-chlorination, 1176
Filter; agitator; Palmer type, use of, at Olean, N. Y., 1381
bottoms; porous; at Flat Rock, Michigan, 494
various types of, 1132
effluent; concentrator for solids in, 1528
plants; Chicago, world's largest at, 1359, 1377
Fredericksburg, Va.; additions and changes in, 641
Southern California, 1
Milwaukee; tuning up, 1310
Filters, pressure; economy of in small cities, 1896
sand; effectiveness of, in removing floc, 147
Filtration; *see also* Coagulation, Flocculation
activated carbon, granular; use of at Bay City, Mich., 593
floc formation; effects of temperature on, 1913

sand; 121
problems and studies on, 1133
producer's grading of, 152
system; working model of, 1975
Financing; *see also* Accounting
of sewer rentals, 625
part played by public service commission in, in Wisconsin, 916
Fire hydrants; see Hydrants
Fire insurance; rate structure of, in Texas, 1001
Fire protection; *see also* Hydrants
lines; cross-connection of, with domestic supply pollutes drinking water during fire, 2006
private; case for, 987
rates and charges in, 979
water works' view of use of public water supplies for, 993
public; rates and charges in, 977
relation of water department to, 1834
work of National Fire Protection Assn., 987
Flat Rock, Mich.; porous filter bottoms at, 494
Flocculation; *see also* Coagulation, Filtration
effectiveness of sand filters in removing floc, 147
effects of temperature on rate of floc formation, 1913
studies on, 1130
Flow augmentation; control of water acidity by, 1877
Fredericksburg, Va.; additions and changes in filtration plant at, 641
Free water; and special rates, 1454
Frost penetration; determination of, diagram for, 2064

G

Garden City, N. Y.; corrosion control by sodium hexametaphosphate in, 1498
Gastro-enteritis; *see* Disease
Geology; of western Pennsylvania, 1859
Germicidal efficiency; of chlorine, effect of ammonia on, 1904
Golden Gate International Exposition; *see* Treasure Island
Government; relation of, to water, 719
Grading system; for public water supplies, 1758, 1986
Ground water; *see also* Wells
chemical pollution of, in Michigan, 2055
for public supply in western Pennsylvania, 1857
Grounding; of electric circuits on services, 115
American Research Committee on; progress report of, 1946
present attitude of A. W. W. A. on, 1940
relation of, to corrosion of services, 1946

H

Hardy Cross method; *see* Hydraulics
Health; *see also* Disease
effect of small amounts of copper on, 2071
hazards to employees in plants, 294
public, and private recreational development, 1014
supervisory control of public water supplies in relation to, in Michigan, 2052
U. S. Public Health Service; research on water, 719
Hexametaphosphate; *see* Sodium hexametaphosphate
Hinsdale, Ill.; management of combined municipal utilities in, 1441
Hollywood, Fla.; concrete coating to prevent soil corrosion at, 1723
Hotels; sanitary standards for, 456
House organs; *see* Newspaper, department
Hydrants; maintaining service through, in sub-zero weather, 2063
number and location of, 1837
standard specifications for, for ordinary water works service, *section of the August issue*
Hydraulic coupling; use of, in new pumping station at Kansas City, Kan., 1348
Hydraulics; flow analysis; Hardy Cross method applied, in Edmonton distribution system, 2038

methods of, 2040
pipe friction; experiments on, in Edmonton, 2046
Hypochlorite; *see* Calcium hypochlorite

I

Indianapolis, Ind.; break-point chlorination at, 1155
methods of leak detection in, 1354
photo-electric cell control of drinking fountain in, 1884
Industrial water; quality requirements for soft drinks, 1512
Intakes; planning and construction of, 661
Ion-exchange materials; *see* Softening
Iron organisms; control by super- and de-chlorination, 1137
Irrigation; special rates for, 1854

J

Jacking; culvert pipe under sewer, 414
Joints, materials for, 1702

K

Kansas City, Kan.; new pumping station at, 1341

L

Laboratory control; and treatment, committee report on, 1507
at Arlington, Va., 652
centralized; in private ownership, 654
determination methods; research on, 1122
devices; 1470, 1528
of Michigan water supplies, 2052
Lake Michigan; taste and odor control on, 1183
Lansing, Mich.; management of combined municipal utilities in, 1435
novel design features of water conditioning plant, 1259
Law; administration handicapped by, 949
advice on, by public service commission in Wisconsin, 918
cross-connection control, present status of, 1737
distribution systems, legal decisions relating to, 1081
liability of water works, modern trends in, 1097
Ohio Conservancy Act, possible uses of, for development of metropolitan water districts, 570
patent legislation, changes in, 729
records necessary to meet new requirements, 912, 1666
sewer rental financing in Canada requires enabling legislation, 639
water and sewerage districts legislation, 62
Leak detection; methods used in Indianapolis, 1354
Leakage; legal decisions regarding, 1082
Lexington, Ky.; maintaining water service in, in sub-zero weather, 2060
Lining; *see also* Coatings
cast-iron mains in position with cement mortar, 819
interior; effect on quality, 1547
Loch Raven Reservoir; relation of manganese in, to other reservoir characteristics, 2017
Los Angeles; commission form of management in, 907
mayor's statement of municipal policy, 911
tests on service life of coal-tar enamel coatings at, 1705

M

Magnesium; rapid determination of, by motorized apparatus, 279
Mains; *see also* Distribution Systems, Pipe, Services
cast-iron; depreciation of, in relation to service life, 795
lining with cement mortar, 819
cleaning of, 77, 1845
rehabilitation of, 1843
sterilization of, at Springfield, Ill., 645
Maintenance; jacking culvert pipe under sewer, 414
legal decisions regarding, 1090

of meters, damaged by freezing, 2065
of pumps, motors, and controls, 423
radio directed crews improve service, 2067
thawing of hydrants and services, 2063
Management; *see also* Accounting, Administration, Financing, Personnel
appraisal of the boss, 952
business basis of, in municipal ownership, 933
combined municipal utility; at Lansing, Mich., 1435
at Hinsdale, Ill., 1441
efficiency in, 1677
engineer's viewpoint on, 923
handicapped by politics and laws, 945
public service commission, 912
value of records to, in small water works, 1101
water board, 899
Manganese; relation of, in reservoirs, to other characteristics, 2028
Marietta, Ohio; rehabilitation of mains in, 1843
Metaphosphate; *see* Sodium hexametaphosphate
Meters; in Akron, Ohio, 1792
low flow; practical and profitable, 1107
maintaining service through, in sub-zero weather, 2061
repair of, damaged by freezing, 2065
Michigan; recent problems and developments in, 2052
Milwaukee, Wis.; tuning up the new filtration plant in, 1310
Mine drainage, acid; relation of, to water supply in western Pennsylvania, 1871
Minneapolis, Minn.; sludge disposal problem in, 1127
Minnesota; detection of coliform organisms in drinking water in, 98
Model filtration system; used in high school, 1975
Mono Craters; pumping and related equipment used on tunnel project, 1242
tunnel construction problems at, 43
Most probable numbers; calculation of, in coli-aerogenes analyses, 478
Motors; *see* Pumps
Municipal ownership; management under, 899, 911, 923, 933, 945, 1435

N

Newspaper, department; development of employee good will by, 1459
methods of organization and publication of, 1464
Niagara River; bacterial pollution of, after sewage treatment at Buffalo, 1529

O

Odor control; *see* Taste and odor control
Office forms; economies in, 221
Ohio Conservancy Act; *see* Law
Ohio River Pollution Survey; *see* Pollution
Oil; pollution by, 465
Olean, N. Y.; use of Palmer filter agitator at, 1381
Olympia, Wash.; gastro-enteritis outbreak traced to painting of water tank at, 1928
Operation; legal decisions regarding, 1090
rating of, as part of approval system, 1990
records of, coordinated with accounting records, 225
Ottumwa, Iowa; super-chlorination at, 1147

P

Paint; in water tank, cause of gastro-enteritis outbreak, 1928
Palmer filter agitator; *see* Filter agitator, 1381
Parks, public system of; value to Rahway, N. J., 1022
Patents; changes in law, 729
Pennsylvania, western; flow augmentation for control of water acidity in, 1877
ground water supply in, 1857

relation of waste disposal to water supplies in, 1867
sources of water supply in, 1869
Personnel; *see also* Management
appraisal of the boss, 952
certification of, in Michigan, 2059
developing *esprit de corps* among, by a department newspaper, 1459
hazards to, in plants, 294
in-service training for, 1451
Petroleum; *see* Oil
Phenol; determination of minute amounts in water containing sodium sulfide, 1038
Photo-electric cell; for control of chlorination, 859
for control of drinking fountain, in Indianapolis, 1884
Phyllopoda; in distribution system, 2056
Pickle liquors, acid; relation of, to water supply in western Pennsylvania, 1873
Pike's Peak; new high pressure steel water supply line at, 1225
Pipe; *see also* Coatings, Corrosion, Distribution systems, Grounding, Joints, Lining, Mains, Services
cast-iron; largest order of 48-inch, ever manufactured, made for Wichita, Kan., 1321
tests used in casting 48-inch pipe for Wichita, Kan., 1338
discussion of specifications for pit-cast, 1697
culvert; jacking under sewer, 414
friction; *see* Hydraulics
laying; discussion of specifications for, 1699
up-to-date methods of, 1696
lines; cross-connections in, simple method for location of, 1998
economic evaluation of tuberculation in, 371
quality affected in, 1547
strength factors in, 1701
lock-bar; tentative specifications for, *a section of the January issue*
steel; electric fusion welded, 30 inches and over, tentative specifications for, *a section of the January issue*
high pressure, for Colorado Springs, 1225
riveted, tentative specifications for, *a section of the January issue*
Plankton counts; rubber rim Whipple cell for, 1470
Plants, aquatic; underwater cutting tool for, 1883
Plumbing; *see* Cross-connections, Services
Politics; handicaps administration of water works, 945
Pollution; bacterial; of Niagara River after sewage treatment at Buffalo, 1529
chemical; of ground water in Michigan, 2055
effect on plant control, 576
petroleum oils, 465
problems in West Virginia related to Ohio River Pollution Survey, 545
salt water; through cross-connection of domestic mains with fire lines, 2006
Pressure; legal decisions on lack of, 1087
Public health; *see* Health
Public relations; customer service bureau a means of improving, 1446
department records related to, 265
department newspaper a means of improving, 1459
radio directed maintenance service improves, 2068
publicized rate structure improves, 365
right attitude in, 958
Public service; engineer's view of, after four years' experience, 945
Pumps; and related equipment used at Mono Craters tunnel project, 1242
deep well turbine; specifications for, 65
maintenance of, 423
motor-driven; testing of, 838
replacement of, at Denison, Tex., 1691

supervisory control of, at Wichita, Kan., 1321
testing, methods of, 845
various types used at new pumping station in Kansas City, Kan., 1341
Purification; *see also* Treatment, Chlorination, Coagulation, Filtration, Flocculation
active problems in, 1118
calcium hypochlorite in, 1517
general discussion on, 1195, 1198

Q

Quality; *see also* Analysis, Bacteriology
bacterial depreciation of, in distribution systems, 1501
effect of copper and brass tubes on, in different waters, 2071
effect of internal pipe lining on, 1547
inadequacy of present standards for, 1753
legal decisions regarding, 1084
proposed grading system for, 1758
rating and approval of, 1992
requirements of, for soft drink industry, 1512
well water; use and limitations of conductivity measurements for determination of, 675

R

Radio; leak locator; used at Indianapolis, 1356
maintenance crews directed by, 2067
Rahway, N. J.; value of public parks system to, 1022
Rates; fire protection, 980
publicity on, 365
special; discussion of, 1454
for increased sales, 1853
structure of; in American cities, 961
Reading, Pa.; super-chlorination with ferrous sulfate de-chlorination at, 1176
Recarbonation; submerged combustion for, 93
Reclamation; *see* Sludge
Records; *see also* Accounting
annual report of small water works, 1101
coordination of operating system and accounting, 225
distribution system; discussion of, 255
recommended practice for, 181
legal value of, 242, 1666
office forms; economies in, 221
property; and valuation, 1666
relation of, to improvement requirements, 247
relation of, to public relations, 265
supply, 255
treatment; value of, 259
Recreation; need for increased space for, 1012
on watersheds, 1009
private development of, and its relation to public health, 1014
Reservoirs; *see also* Tanks
distribution; capacity requirements and design of, 1819
tentative specifications for, *a section of the December issue*
pre-stressed concrete, in San Francisco distribution system, 1829
impounding; manganese in, in relation to other characteristics, 2028
regulation of recreation on, 1016
underwater cutting tool for aquatic plants in, 1883
silting of, 25
standpipes; tentative specifications for, *a section of the December issue*
Richmondville, N. Y.; construction of small pressure filter plant in, 1896

S

Sabotage; organizing to prevent, 1732
Safety; *see* Personnel
St. Paul, Minn., administration of sewer rentals in, 1685
Sales, water; increasing, 1853
Salt removal; *see* Softening
Sampling; importance of, in distribution system, 649
San Francisco; capacity requirements

and design of distribution reservoirs in, 1819
water supply system of, 751
Worlds Fair; *see* Treasure Island
Sand, filter; *see* Filter sand
Sanitation; of recreational places, jurisdiction over, 1013
standards for hotels, 456
Sedimentation basins; design of, 1131
Service life; of cast-iron mains related to depreciation, 795
of coal-tar enamel coatings, 1705
Services; *see also* Cross-connections, Distribution systems, Grounding, Pipe
brass, use of, 2071
copper, use of, 2071
corrosion of; 408
related to protective grounding of electrical installations, 1946
maintaining service through, in sub-zero weather, 2064
in Akron, 1792
materials for, 1850
ownership and maintenance of, 1848
Sewage disposal; relation of, to water supply in western Pennsylvania, 1870
Sewer rentals; administration of, 1685
financing of, bases for charges, 625
Sewerage districts; law on, 62
Silting; *see* Reservoirs
Sludge; disposal of, new developments in, 1127
reclamation of, new methods in, 1128
return and use of, in softening at Ann Arbor, Mich., 1600
Sodium hexametaphosphate; for corrosion control, 1484, 1495, 1498
physiology of, 1471
Sodium sulfide; effect of, on determination of minute amounts of phenol in water, 1038
Soft drink industry; water quality requirements of, 1512
Softening; new projects in, 1126
observations on, 85
plants; at Ann Arbor, Mich., 1587, 1600
in Southern California, 1
removal of salts, 435
zeolite; use of, 1129
carbonaceous, experiences with, 583
Solids; concentrator for, in filter effluent, 1528
Southern California; *see* California, Southern
Specifications; *see* American Water Works Association
Springfield, Ill.; department newspaper in, 1459
sterilization of new mains in, 645
Springfield, Mass.; study of main depreciation in, 795
Standards, water supply; setting up minimum, 1753, 1986
Standpipes; *see* Reservoirs
Sterilization; *see* Mains, Chlorination
Storage; *see* Tanks, Reservoirs
Sulfur dioxide; use of, in purification, 1129
Sulfur organisms; control by super- and de-chlorination, 1137
Super-chlorination; *see also* Chlorination
break-point; observations on, 1027, 1187
control of algae by, 1172
control of iron and sulfur organisms by, 1137
use at Indianapolis, 1155
use at Ottumwa, Iowa, 1147
use at Reading, Pa., 1176
Supply; Akron system of, 1775
new sources of; for American cities, 1120
in Michigan, 2054
records of, 255
San Francisco and Treasure Island systems, 751
surface; algae and crustacea in, in Michigan, 2056
Surplus land, use of in Akron, 1782
Swimming pools; water treatment in, 105
Syracuse, N. Y.; watershed protection in, 555

T

Tahlequah, Okla.; application of simple method for location of cross-connections in, 1997

Tanks; *see also* Distribution system, Reservoirs
elevated; painting of, causes outbreak of gastro-enteritis, 1928
tentative specifications for, *a section of the December issue*
pressure; explosion in, 1770
steel; cathodic protection of, 1069, 1075
Taste and odor control; *see also* Chlorination, Super-chlorination, Purification, Treatment
developments in, 1191
in Dallas, 613
on Lake Michigan, 1183
Temperature; effect of, on rate of floc formation, 1913
sub-zero; maintaining water service during, 2060
Tennessee Department of Health; rating and approval of public water supplies by, 1986
Testing; *see* Pumps, Bacteriology, Analysis, Control
Texas Fire Insurance Dept.; rate control by, 1001
Thawing; *see* Maintenance
Toronto, Ont.; bacterial depreciation of quality in distribution systems in, 1506
Treasure Island; cathodic protection of domestic distribution system at, 305
pollution of drinking water at, through cross-connection with fire lines, 2006
supply system of, 785
Treatment; *see also* Chlorination, Coagulation, Filtration, Flocculation, Purification, Taste and odor control
and laboratory control, committee report on, 1507
of swimming pool water, 105
plants; new, in Michigan, 2053
Tuberculation; *see also* Corrosion
economic evaluation of, in pipe lines, 371
effects of, 387
Tunnels; construction problems in, 43
pumping and related equipment used in, 1242
Typhoid; *see* Disease

U

U. S. Public Health Service; *see* Health

V

Valuation; and property records, 1666
Valves; *see also* Distribution system, Cross-connections
records of, 181
types installed in cross-connections at Treasure Island, 2007
types required in cross-connections, 1737

W

Waco, Tex.; commission form of management in, 909
War; *see* Defense
Waste disposal; relation of, to western Pennsylvania water supplies, 1867
Water districts; law on, 62
pro and con, 57
Water works practice; committee report on, 502
Watersheds; multiple use of, effect on conservation, 1024
protection of, for Syracuse supply, 555
recreational use of, 1009
Wells; *see also* Ground water
casings, screens and drilling in western Pennsylvania, 1862
deep; specifications for, 65
pumps for, specifications for, 65
West Virginia; stream pollution problems in, related to Ohio River Pollution Survey, 545
Western Pennsylvania; *see* Pennsylvania, western
Whipple cell; with rubber rim, for plankton counts, 1470
Wichita, Kan.; improvements to water supply in, 1321

Z

Zeolites, carbonaceous; *see* Softening

Author Index

ABRAHAMS, HAROLD J., working model of a filtration system, 1975
ALDRICH, E. H., *see* NEWSOM, REEVES
ALEXANDER, LOUIS J., control of iron and sulfur organisms by super-chlorination and de-chlorination, 1137
economic evaluation of tuberculation in pipe lines, 371
ANDERSON, S. T., sterilization of new mains at Springfield, Ill., 645
ANGUS, R. W., testing motor-driven pumps, 838
APPLEBAUM, S. B., *discussion*—removal of salts from water, 453
recent experiences with carbonaceous zeolites, 583
ASHLINE, R. R., corrosion of consumers' plumbing, 408
ARNOLD, G. E., sanitary standards for hotels, 456
AULTMAN, W. W., *see* MONTGOMERY, J. M.
AYRES, LOUIS E., water softening at Ann Arbor, 1587

BALDWIN, R. L. AND TIMANUS, C. S., new pumping station at Kansas City, Kan., 1341
BANKS, WILLIAM, need for increased space for recreation, 1012
BAUSHER, L. W., delivery of treated water and reconditioning of force main, Akron, 1784
BAYLIS, JOHN R., general discussion of water purification, 1195
water quality standards, 1753
BEHRMAN, A. S., *discussion*—use of granular activated carbon at Bay City, Mich., 606
BENDER, RICHARD, *see* WEBER, GEORGE R.
BENGOLEA, DANIEL J., *see* TRELLES, ROGELIO A.
BHOOTA, B. V., *see* CAMP, THOMAS R.
BILLINGS, L. C., taste and odor control in Dallas, 613
BLACK, RUSSELL VAN NEST, regulation of recreation on watersheds and reservoirs, 1016
BLUMBERG, O. C., corrosion control, 394
BOEKLEY, F., city properties, Akron, 1790
BONN, GEORGE S., experiences with a department newspaper, 1459
BRENNEKE, A. M., a program of equipment replacement, 1689
BRONSON, DEMING, protective coating for steel water lines, 1385
BROWER, J., maintenance of pumps, motors and controls, 423
BROWN, ARTHUR C., changes in patent laws, 729
BROWN, HORACE A., super-chlorination at Ottumwa, Iowa, 1147
BROWN, K. W., use and limitations of conductivity measurements of well water quality, 675
BUGBEE, PERCY, organizing to prevent fires, 987
BURGESS, PHILIP, pipe laying up to date, 1696
BURRELL, H., *discussion*—removal of salts from water, 452

CALDWELL, MARY E., induced slow lactose fermentation in *Escherichia coli*, 659
CALVERT, C. K., treatment with copper sulfate, chlorine and ammonia, 1155
CAMP, THOMAS R., ROOT, DARRELL A. AND BHOOTA, B. V., effects of temperature on rate of floc formation, 1913
CAMPBELL, M. S., gastro-enteritis outbreak traced to painting of water tank, 1928
CAMPION, H. T., *discussion*—porous filter bottoms at Flat Rock, Mich., 500
CARR, J. A., standard specifications for deep well pumps, 72
CARTER, I. N., water plant control as affected by stream pollution, 576

CASWELL, H. H., development of Ann Arbor water supply, 1577
CHASE, E. SHERMAN, present status of cross-connection control, 1737
discussion—rating and approval of public water supplies, 1994
CHEEK, W., new law on water and sewerage districts, 62
COLE, CARTER S., use of copper and brass tubes, 2071
COWLES, M. W., introduction to symposium on recreational use of watersheds, 1009
CRITCHLOW, H. T., regulation by the State Water Policy Commission, 1018
CROFT, H. P., jurisdiction over sanitation of recreational places, 1013

DAVIS, ALBERT R., the Texas fire insurance department, 1001
DAVIS, D. E., observations on water softening, 85
DES BAILLETS, C. J., methods of testing pumping equipment, 845
DOHE, R. C., simple method for location of cross-connections in piping systems, 1997
DOWNER, J. B., grounding of electric circuits on water pipes, 115
DUNN, S. M., pumping and related equipment used on Mono Craters tunnel project, 1242

ECKART, NELSON A., water supply system of San Francisco, 751
ECKERT, OTTO E., management of combined municipal utilities, 1435
EDWARDS, S. E., *see* MCCALL, G. B.
ERICKSON, CLAUD R., novel design features of the Lansing water conditioning plant, 1259
EVANS, S. A., effect of enlarging a main at point of diversion of a branch line, 431

FARRA, ELWOOD, maintaining water service in sub-zero weather, 2060
FARRELL, R. P., rating and approval of public water supplies, 1986
FASKEN, J. E., determination of small amounts of cyanide in water, 487
FAUST, RAYMOND J., recent problems and developments in Michigan, 2052
FEBEN, DOUGLAS, *discussion*—phenol determination, 1042
FISHER, H. B., public relations and department records, 265
FORD, J. W., *see* HARNISH, C. P.

GALLAHER, WILLIAM U., control of algae at Appleton, Wis., 1165
GAYTON, LORAN D., world's largest filtration plant, 1359, 1377
GEIGER, J. C., pollution of drinking water through cross-connection with fire lines, 2006
GERRARD, H. J., filter sand from a producer's standpoint, 152
GETTRUST, J. S., watershed and impounding reservoirs, Akron, 1779
GIBBONS, M. M., water pollution by petroleum oils, 465
value of public park systems to Rahway watershed, 1022
GIBSON, J. E., lining cast-iron mains in position with cement mortar, 819
GIDLEY, A. T. AND WESTON, ROBERT SPURR, corrosion control by sodium hexametaphosphate, 1484
GOODMAN, A. E., new impounding reservoirs, Akron, 1780
GORMAN, ARTHUR E., *discussion*—world's largest filtration plant, 1359
GOTSCHALL, J. L., storage of water, Akron, 1787
GOUDEY, R. F., removal of salts from water, 435
GREGORY, ARNOLD F., protection of watershed for Syracuse supply, 555
GRIFFIN, A. E., observations on break-point chlorination, 1187

HALL, L. S., silting of reservoirs, 25
HANSEN, PAUL, active problems in water purification, 1118
HANSON, R., domestic services and meters, Akron, 1792

AUTHORS

HARDING, J. C., specifications for construction of deep wells, 65
HARNISH, C. P. AND FORD, J. W., improvement requirements and department records, 247
HARPER, L. E., chemical feeders, 1886
HARRINGTON, J. H., photo-cell control of water chlorination, 859
HARRIS, B. B. AND SILVEY, J. K. G., underwater cutting tool for aquatic plants, 1883
HARRIS, H. A., JR., department records for supply and distribution, 255
HARRISON, LOUIS B., use of granular activated carbon at Bay City, Mich., 593
HAYES, HARRY, service life of coal-tar enamel protective coatings, 1705
HAZEN, H. J., service permits and meter billing, Akron, 1791
HINDERSCHIED, F. M., pumping of treated water, Akron, 1783
HIRSCH, A. A., rubber rim Whipple cell for plankton counts, 1470
HOEFLE, K. F., radio directed water and sewer service, 2067
HOFFMAN, L. J., office practice, Akron, 1798
HOGLE, GEORGE, accounting, Akron, 1797
HOPKINS, E. S., *see also* MCCALL, G. B.
discussion—filter sand, 141
HOSKINSON, C. M., treatment records and their value, 259
HOSTETTLER, C. O., raw water—its delivery and treatment, Akron, 1782
HOTCHKISS, H. T., *discussion*—filter sand, 136
HOUSTON, J., repumpage to high service districts, Akron, 1785
HOWARD, NORMAN J., discussion on water purification, 1198
bacterial depreciation of water quality in distribution systems, 1501
HOYT, EARLE S., rehabilitation of water mains, 1843
HULBERT, R., *discussion*—filter sand, 139
HURLBUT, W. W., *discussion*—water board and management, 907
HURST, C. K., distribution system analysis in Edmonton, 2038
HYDE, CHARLES GILMAN, *memorandum*—pollution of drinking water through cross-connection with fire lines, 2014

INGLEE, C., *discussion*—economic evaluation of tuberculation in pipe lines, 385
IRVING, W. G., water department records and legal operation, 242

JACOBS, N. B., coordinating operating system records with accounting records, 225
JACQUES, H. L., Mono Craters tunnel construction problems, 43
JARVIS, L. E., annual report of a small water works, 1101
JONES, K. K., physiology of sodium hexametaphosphate, 1471
JORDAN, HARRY E., *discussion*—sanitary standards for hotels, 464
organizing for community defense, 1732
discussion—water quality standards, 1767
protective grounding of electric installations—present attitude of A. W. W. A., 1940

KARPEN, R. J., investigation of a water pressure tank explosion, 1770
KENNEDY, R. C., capacity requirements and design of distribution reservoirs, 1819
KERSLAKE, JAMES E., tuning up the new Milwaukee filtration plant, 1310
KLEINHENZ, JOHN E., photo-electric control for a drinking fountain, 1884
KNEALE, JOHN S., centralized laboratory control for a group of privately operated water supplies, 654

KNEELAND, H. C., *discussion*—ground water for public supply in western Pennsylvania, 1865
KNUDSEN, H. A., corrosion and tuberculation, 387

LADUE, W. R., water supply at Akron—introduction, 1777
LANGELIER, W. F., motorized apparatus for the rapid determination of calcium and magnesium in water, 279
LAUGHLIN, HENRY F., developments in taste and odor control, 1191
LAUX, P. C., break-point chlorination at Anderson, Ind., 1027
LAWRENCE, R. E., improvements to Wichita, Kan., water supply, 1321
LEE, C. H., cathodic protection on the domestic distribution system at Treasure Island, 305
LEGGETTE, R. M., ground water for public supply in western Pennsylvania, 1857
LEVEQUE, ROLAND J., additions and changes at Fredericksburg, Va., 641
LEVINE, MAX, *see* WEBER, GEORGE R.
LOGAN, JOHN O. AND SAVELL, WALTER L., calcium hypochlorite in water purification, 1517
LUNDBERG, A. T., importance of sampling and studying the water in the distribution system, 649

MABEE, W. C., steel tank corrosion prevention, 1075
MACDOWELL, ROLLIN F., management of municipal water works on a business basis, 933
MAFFITT, DALE, L., special rates and free water service, 1454
MALLALIEU, W. C., private recreational development and public health, 1015
MARSTON, FRANK A., legal decisions relating to distribution of public water supplies, 1081
MARTIN, F. W., *discussion*—management of combined municipal utilities, 1441
MCCALL, G. B., EDWARDS, S. E. AND HOPKINS, E. S., effectiveness of sand filter layers in removing floc, 147
MCDONALD, NORMAN G., water works intakes, 661
MCDONNELL, R. E., engineer looks at management, 923
MCENTEE, HARRY E., operation of the Ann Arbor softening plant, 1600
MCGEE, J. HERMAN T., concrete coating for underground piping, 1723
MCNUTT, PAUL V., water and government, 719
MEDBERY, H. C., *discussion*—conductivity measurements of well water quality, 687
MELLETT, JOHN C., public relations, 958
MEYERHERM, C. F., *see* WARREN, H. S.
MITCHELL, GEORGE, use of surplus lands, Akron, 1782
MOKE, E. W., water rate structures in American cities, 961
MONTGOMERY, J. M. AND AULTMAN, W. W., water-softening and filtration plant of the Metropolitan Water District of Southern California, 1
MOORE, W. D., *discussion*—improvements to Wichita, Kan., water supply, 1338
MOSLEY, E. L., new high pressure steel water supply line for Colorado Springs, Col., 1225
MOTT, KENNON, water quality requirements of the soft drink industry, 1512
MURDOCH, JOHN H., JR., use and abuse of depreciation, 1647
MYERS, W. E., collections, Akron, 1795

NEWSOM, REEVES, water works' view of use of public water supplies for private fire protection, 993
property records and valuation, 1666
——— AND ALDRICH, E. H., depreciation

AUTHORS

tion of cast-iron water mains related to actual service lives, 795
NIEMEYER, H. W., leak detection, 1354
NIXON, ROBERT A., public service commission and plant management, 912
NOLLEN, HENRY S., water board as a factor in good management, 899
NORCOM, G. D., corrosion problem in water works, 401
NORMAN, EARL E., cathodic protection of steel water tanks, 1069

OLSEN, L., industrial services and meters, Akron, 1794
OLSON, H. M., *discussion*—water softening, 90

PAUL, F. D., distribution of water, Akron, 1788
PETERS, W. A., publicizing a good rate structure, 365
POCCARD, ADOLFO GONZALEZ, *see* TRELLES, ROGELIO A.
POMEROY, R., calculating most probable numbers in coli-aerogenes analyses, 478
POWERS, NEWTON, handling and feeding activated carbon at Detroit, 621

RAFKIND, I., economies in office forms, 221
RAWLINS, GEORGE S., *discussion*—equipment replacement program, 1693
REDDING, G. R., modern trends in legal liability, 1097
REHLER, JOSEPH E., experiences with the Palmer filter agitator at Olean, 1381
RENZONI, L. S., determination of minute amounts of phenol in water containing sodium sulfides, 1038
RIDDICK, T. M., filter sand, 121
author's closure, 146
RIPPLE, O. J., use of activated carbon in purification plants, 609
ROBINSON, D. W., increasing water sales, 1853
ROGERS, ALLAN H., progress report on the use of sodium hexametaphosphate at Garden City, N. Y., 1498
ROHAN, GEORGE J., *discussion*—water board and management, 909
ROOT, DARRELL A., *see* CAMP, THOMAS R.
RUSSELL, A., water districts pro and con, 57

SAVELL, WALTER L., *see* LOGAN, JOHN O.
SCOTT, L. H., development of submerged combustion for recarbonation, 93
SEMPLE, LORENZO, JR., personnel relations, 952
SHARP, LLOYD B., outdoor recreation as related to watersheds, 1010
SHEPHERD, R., jacking 72-inch culvert pipe under outfall sewer, 414
SHOEMAKER, WILLIAM C., ownership and maintenance of service lines and curb boxes, 1848
SILVEY, J. K. G., *see* HARRIS, B. B.
SIMPSON, R. W., *see* SYMONS, G. E.
SMITH, HAL F., customer service bureau, 1446
SOLDNER, A. A., hazards to employees in water works plants, 294
STANLEY, W. E., *discussion*—filter sand, 137
STAPLEY, E. R., *discussion*—filter sand, 144
STAUB, W. S., main cleaning, 77
STEGMAIER, ROBERT B., JR., *see* WOLMAN, ABEL
STEVENS, JAY W., relationship between fire and water departments, 1834
STEVENS, L., porous filter bottoms at Flat Rock, Mich., 494
STORRIE, WILLIAM, sewer rental financing, 625
STROCKBINE, WALTER, super-chlorination with ferrous sulfate dechlorination, 1176
SYMONS, G. E. AND SIMPSON, R.W., bacterial pollution of the Niagara River, Part 2, 1529

TAYLOR, D. M., study of procedures for detection of coliform organisms in Minnesota drinking water, 98
THIEME, R. B., *discussion*—removal of salts from water, 450
THOMAS, NORTON A., taste and odor control on Lake Michigan, 1183
THOMPSON, LEONARD N., efficiency in managing water works properties, 1677
TIMANUS, C. S., *see* BALDWIN, R. L.
TISDALE, E. S., Ohio River Pollution Survey's relation to stream pollution problems in West Virginia, 545
TRAX, EDWARD C., notes on corrosion prevention by sodium hexametaphosphate, 1495
TRELLES, ROGELIO A., BENGOLEA, DANIEL J. AND POCCARD, ADOLFO GONZALEZ, fractionated coagulation—a new procedure, 742
TRENTLAGE, LAVERNE, is it profitable and practical to have accurate meters, sensitive to low flows?, 1107

WALLENE, FRANK O., engineer's view of public service, 945
WARING, F. H., possible uses of Ohio Conservancy Act for developing and operating water and sewerage facilities in metropolitan areas, 570
WARREN, H. S. AND MEYERHERM, C. F., progress report, American Research Committee on Grounding, 1946
WATKINS, WILLIAM W., a small pressure filter plant, 1896
WEBER, GEORGE R., BENDER, RICHARD AND LEVINE, MAX, effect of ammonia on the germicidal efficiency of chlorine in neutral solutions, 1904
WEIGAND, HERMAN, concentrator for solids in filter effluent, 1528
WEIR, PAUL, effect of internal pipe lining on water quality, 1547
WESTON, ROBERT SPURR, *see* GIDLEY, A. T.
WHITE, H. L., swimming pool water treatment, 105
WIGGIN, T. H., *discussion*—steel tank corrosion prevention, 1077
WILBER, C. P., effect of multiple use of watershed on conservation, 1024
WOLMAN, ABEL AND STEGMAIER, ROBERT B., JR., manganese in the Loch Raven Reservoir, 2015

YOUNG, C. H., relation of waste disposal to western Pennsylvania water supplies, 1867

Index of Abstract Topic Headings

Accounting, 345, 1643
Administration, Personnel and Public Relations, 165, 339, 1636, 1972
Algae Control, 1969
Apparatus, *see* Laboratory Methods
Aqueducts, *see* Tunnels
Bacteriology, 692
Boiler Feedwater, 702
Chemical Feeding, Conditioning, Sedimentation, 879
Chemistry, 361, 533, 1423
Concrete, 714
Conditioning, *see* Chemical Feeding
Corrosion and Corrosion Control 355, 1619
Cross-Connections and Plumbing, 2077
Dams, 1053
Distribution—Mains, Valves, Reservoirs and Tanks, 348, 1806
Drainage, *see* Hydrology
Drought, *see* Hydrology
Equipment, *see* Laboratory Methods
Feedwater, *see* Boiler Feedwater
Filtration, 1213
Floods and Flood Control, *see* Hydrology
Ground Water, *see* Wells
Health and Hygiene, 892
Hydraulics, 159, 1951
Hydrology, 1058, 2091
Hygiene, *see* Health
Impounding Reservoirs, 1044
Industrial Water Supply, 1967
Iron Removal, *see* Softening
Irrigation, *see* Hydrology
Laboratory Methods, Equipment and Apparatus, 1800
Mains, *see* Distribution
Meters and Services, 1634
Odor Control, *see* Taste and Odor Control
Personnel, *see* Administration
Plumbing, *see* Cross-Connections
Pollution and Pollution Control, *see* Stream Pollution
Public Relations, *see* Administration
Pumping, 155
Quality, 1628
Rates, 1218
Reclamation, *see* Hydrology
Reservoirs, *see* Distribution; Impounding Reservoirs
Sedimentation, *see* Chemical Feeding
Services, *see* Meters
Softening and Iron Removal, 709
Sterilization, 175
Stream Pollution and Control, 537, 1201
Supply, *see* Water Supply
Tanks, *see* Distribution
Taste and Odor Control, 1631
Treatment—General, 871
Tunnels and Aqueducts, 352, 1814
Valves, *see* Distribution
Water Supply—General, 521, 1408, 2080
Water Supply—Industrial, *see* Industrial Water Supply
Wells and Ground Water, 884

Abstract Subjects

For location of articles under general subject headings, see the Index of Topic Headings on page 2142. Specific items under those headings are contained in the following pages.

A

Acidity; attack on lead pipes caused by, 1622
graphic representation of, 877
Acid-resistant pipe; tests of, 1807
Activated carbon; filters; construction and operation of, in Germany, 1633
manufacture of and specifications for, 883
production of, from bituminous coal, 1433
Adjustment accounts; disposition of amounts in, 1644
Aeration; use of, by small water works, 710
After-precipitation; prevention of, by T. O. treatment, 880
Aggressivity; corrosion caused by, 1627
treatment for, 359
Air-conditioning equipment; corrosion inhibition in, 1628
Albert Lea, Minn.; improvements to water works in, 1415
Alcohol; effect of, in disinfection of hands, 701
Algal cycle; controlling factors of, 1050
Algiers; problem of water in, 2086
Alkalinity; attack on lead pipes caused by, 363
automatic determination of, 363
Allassions; use of, in Zerhyd process of softening, 709
Alpe-d'Huez; supply project in, 1417
Alum; manufacture of, 881
Aluminum, determination of, by micro-photometric test, 1433
sulfate; control of addition of, by photo-electric and conductimetric method, 882
American Water Works Association; service of, to water works men, 1637
Amine resins; *see* Resins, amine
Amylase, salivary; effect of fluorides on, 894
Analysis; bacteriological; automatic device for extraction and inoculation of samples in, 1802
book report on *Bergey's Manual*, 5th ed., on, 701
use of coli-aerogenes index of pollution in, 699
chemical; necessity of, for examinations of potability and for hydro-geological studies, 1427
rapid method for checking accuracy of, 1802
Andrews' volumetric method; use of, for determination of sulfuric acid in waters of varying hardness, 1428
Anopheline breeding; suggested classification of ponds on, based on desmids, 1048
Anthrax spores; germicidal action of halogens on, 179
Archimedes; screw of, comment on, 162
Arsenic; determination of; in food coloring materials, 1430
organically bound in potable waters, 1429
modified apparatus for Gutzeit test for, 1804
Asphaltic bitumen; *see* Bitumens, asphaltic
Asbestos-cement pipe; costing for, 1807
laying of, at Little Rock, Ark., 348
Asymptotic method; determination of depreciation by, 1643
Atmosphere; measure of rate of exchange of oxygen between, and water basin, 2092

B

Bacteria; action of chlorine on, 178
in fresh water, 1050

Bacteriology; investigations in, by U. S. Public Health Service, 892
Basic fuchsin; *see* Fuchsin, basic
Bending; of pipe lines, 349
Bergey's Manual; book report on fifth edition of, 701
Bills; liens against property for, 170
Biological processes; treating wastes by, 1205
Bismuth-sulfite media; dye modification of, 698
Bits; individual, 884
Bitumens; asphaltic; internal protection by, 360
utilization of, in construction of water pipes and irrigation projects, 1807
Bituminous coal; *see* Coal, bituminous
Bone char reactivation; new method and apparatus for, 1633
Bone filters; development and use of, for fluorine removal in drinking water, 1431
Boron; estimation of, by modified flame test, 1432
special problems created by, in Los Angeles water supply, 2095
Brackets; pipe line servicing aided by, 1810
Break-point chlorination; *see* Superchlorination
Brines; discharge of, on Severn River, 710
oil field; underground disposal of, 886
Bromides; effect of, on iodide determination in mineral waters, 1432
use of mercurous perchlorate as volumetric reagent for, 1432
Bromine; systematic investigation for, 1432
Brookline, Mass.; lowering water main at, 349
Bucharest; water supply of, 2089

C

Calcination, lime; fundamental mechanics of, 881
Calcium; bicarbonate; solubility of, 362
chloride; effect of, on concrete pipe, 718
Calgon; *see* Sodium hexametaphosphate
California; coastal water pollution in, 1210
Southern; water supply of, from Colorado River, 352, 353
Canada; industrial waters in, 1967, 1968
Carbon dioxide; determination of, 363
distribution of, between water and steam, 1427
in equilibrium in natural water, simplified calculation of, 1428
Caron water storage project; construction of, 1046
Carron reservoir; design and construction of, 1045
Carrying capacity of pipe; losses of, in service, 1951, 1953
restoration of, 350, 360
at Konigsberg, 1809
Cast-iron pipe; cement jointing materials for, 1809
long time service of, 1808
rubber packing for, replaces jute and hemp in Akron, 1809
Cathodic protection; 359, 1624, 1626
Cavitation; effect of, on erosion and corrosion, 1964
Cement; *see also* Concrete
solubility of, 717
Certification; of operating personnel, 1639
Charleston, W. Va.; treatment methods of four filter plants supplying, 1215
Chatauqua Lake; limnological study of, 1971
Chemical industry; waste problems in, 1204
Chemical variables; of algal cycle, changes in, 1050
Chemicals; use in preventing deposits in pipe lines, 704
use of, in treatment, 872
Chemistry; in replenishment of ground water, 890
Chicago; new filter plant in, 1213
Chilcote pumping station and softening plant; description of, 2088
Chloramine residuals, 175
Chlorides; effect of, on iodide determination in mineral waters, 1432

use of mercurous perchlorate as volumetric reagent for 1432
Chlorination; *see also* De-chlorination, Super-chlorination
use of, for control of mussels and algae, 1969
Chlorinator, automatic, 176
Chlorine; color tests for, 1429
heat capacity, vapor pressure, heats of fusion, vaporization and entropy of, 1429
residuals, 175
Clarifiers; design of, 884
use of, 161
Clays, sulfate bearing; effect of, on concrete, 717
Clear well, concrete; construction of, 351
Coagulants; increasing dosage of, improves water quality, 1630
laboratory stirrer for, 1803
Coal, bituminous; production of active carbon from, 1433
Coastal waters; pollution of, off California, 1210
Codes, plumbing; analysis of, 800, 2077
Coli-aerogenes index; use of, in bacteriological analysis, 699
Coliform organisms; aberrant, proposed grouping of, 694
detection of, with sodium lauryl sulfate broth, 699
ecological study of, 696
general discussion of, 693
optimum temperature of, for differentiation of *Esch. coli* from others, 695
Colloid chemistry; use of, in purification, 883
use of, in treatment, 1423
Colon groups; colon - typhoid - salmonella; mucoid dissociation in, 696
Color reagents; formaldoxines as, for certain metals, 1433
Colorimetric determination; of chlorine, ozone and hypochlorites, 1429
of fluorides, 1430
of fluorine, with ferron, 1431
of manganese, with periodate, 1433
Columbus, Ohio; use of Calgon at, 1216
Conchas dam; engineering geology problems at, 1055
Concrete; clear well constructed of, 351
pipe; cores for, 351
effect of calcium chloride on, 718
Conductimetric method; use of, in controlling addition of aluminum sulfate, 882
Conductivity, electrical; determination of total dissolved solids by, 1434
Connecticut; limnological studies in, 1051
Conservation; on a vast scale, 1638
Consumption; methods to assure and increase, 1638
Controller, specific duties of, 345
Conduits, outlet; deflectors for, 161
Copper; determination of, in food coloring materials, 1430
pipe; action of water on, 1619
soil corrosion of, 355, 1621
use of, in water practice, 1808
removal of, from natural water, 1424
sulfate; use of, in water works, 882
Cores; use of, in concrete pipes, 351
Corrosion; cause and remedy of, in locomotive tubes and sheets, 704
effects of turbulence and cavitation on, 1964
Cost; chlorine usage based on, 178
historical; recent developments in, 1219
production; effect of rise in, on utility investors, 1218
Couples, metal; dissimilar, 1622
Cuma-system; combating iron bacteria and fungi by, 180
Currents, lake; effect of, on water supply, 1047

D

Dairy industry; requirements of good water supplies for, 1968
Danube, upper; flood protection along, 1060
da Vinci, Leonardo; studies by, in hydraulics, 162
Debt, bonded; for 289 cities at beginning of 1939, 169

De-chlorination; *see also* Super-chlorination
use of, after super-chlorination, 180
Decolorization; of water containing humic acid, sodium aluminate as a precipitating agent for, 1424
Delaware Aqueduct; construction and design of, 1814
shaft sinking on, 355
Depreciation; asymptotic method of 1643
current practices in, 345
methods of, used by water utilities, 346
technical aspects of, 1643
Desmids; classification of ponds based on, 1048
Dewponds; observations on, 2092
Discharge; through small circular orifices, 1957
weir; at low heads, 1957
measurement of, error in, due to transverse slope of weir crest, 1958
Disinfection of hands; effect of alcohol on, 701
Dissolved iron concentration; reaction between iron and pure water at room temperature causes, 1427
Dissolved oxygen; determination of, 364
Distilled water; lead pipes attacked by, 1622
Diversion; California Railroad Commission order on, 1422
"Domestic purposes"; legal definition of, 168
Dowsing; relation of, to engineering and medicine, 888
Drainage; into wells, 885
Dye modification; of bismuth-sulfite media, 698
Dyeing; treating water for use in, with ion exchangers, 1424, 1968
Dysentery, Shiga; outbreak of, in Michigan in 1938, 894

E

Earthing; to water pipes, 1625
East Brabant, Neth.; past, present and future of water company of, 1416
Economics; relation of, to public ownership, 1636
Economy, raw material; in water works practice, 1419
water; meters and repair an aid to, 1635
in industrial district on Rhine River, 1419
on Enft basin, 1065
Electricity; determination of ground water by, 887
determination of logs of wells by, 887
determination of total dissolved solids by, 1434
measurement of metal wall thickness by, 1804
Electrolysis mitigation; work of joint corrosion committee on, 1625
Embrittlement; review of present status of, 703, 704, 707
Emergencies; notification of health agencies in, 165
Employees; *see* Personnel
Endemic goiter; *see* Goiter, endemic
Enft basin; water economy of, 1065
Engineering; sanitary; progress in, in Britain in 1939, 2085
progress in, in U. S., in 1939, 878
England; *see* Great Britain
Equilibrium; calculation of, in dilute water solutions, 1965
carbon dioxide in, in natural waters, simplified calculation of, 1428
Equipment industry; viewpoint of, on industrial wastes, 1204
Erie, Pa.; 1939 annual report of water bureau of, 1412
Erosion; control of, reduction of reservoir silting by, 1052
effects of turbulence and cavitation on, 1964
soil; in the Emilian Appenines, 2098
Esch. coli; optimum temperature for differentiation of, from other coliform bacteria, 695
respiration and growth properties of, surviving sublethal temperatures, 697
Evaporation; determination of, from land and water surfaces, 1067
determination of, from reservoirs, 1053
natural convection; heat transfer in, 703

F

Feed-pumps; pH guides selection of materials for, 708
Fermentation industry; wastes problem in, 1203
Ferric sulfate; manufacture of, 881
Ferron; use of, for colorimetric determination of fluorine, 1431
Ferrous sulfate; storage of, 881
Film formation; of tea, effect of tap water on, 1629
Filters, rapid sand; in iron removal, 713
Fish; in reservoir, chemical poisoning effects on, 1052
Flame test, modified; use of, for estimation of boron, 1432
Flash-board pins; collapsible, 1057
discussion of formulas for, 1960
Flow; construction of manometers for measurement of, 1957
electronic meters for measurement of, 1803
research on, 162
stream; application of measure of uniformity to, 1062
through porous media, 1954
Fluorides; determination of, new colorimetric method for, 1430
effect of, on salivary amylase, 894
poisoning from, in hot spring water, 895
Fluorine; content in urinary excretion, food and water, 895
determination of, colorimetrically, with ferron, 1431
determination of, in lime, 880
determination of, in wine, 1430
removal of, by bone filter, 1431
Fluorosis; distribution of, in India and England, 895
Formaldoxine; use of, as color reagent for certain metals, 1433
Fort Wayne, Ind.; new filter plant at, 1213
Freezing; of mains; *see* Thawing
soil; new method of, 354
Friction, pipe; new formula for, 1967
Fuchsin, basic; toxicity of, for certain bacteria, 695

G

Gases, poison; protection against, in war time, 166
toxic; detection of, in industry, 896
Geology, engineering; at Conchas dam, 1055
Germicidal action; of halogens on anthrax spores, 179
Gloucester, Mass.; important assets of water supply of, 1415
Goiter, endemic; treatment of, 894
Grand Rapids, Mich.; new supply of, from Great Lakes, 1411
Graphic representation; of acidity of soft waters, 877
Great Britain; distribution of fluorosis in, 895
geological survey on underground water in, 888
typhoid in, 893
water works practice in, 2082
Ground water; effect of, on concrete, 717
use of, for irrigation, 2096
Grouting; use of, to prevent leakage around an earth dam, 1058
Gutzeit test; modified apparatus for, 1804

H

Halogens; germicidal action of, on anthrax spores, 179
Hardness; determination of, 362
determination of, automatically, 363
Harrisburg, Pa.; new water supply of, 1413
Haweswater dam; construction of, 1053
Hazards; occupational disease; in public utilities, 167
tornado; removal of, from Kansas supply, 1421
Health; notification of agencies of, in emergencies, 165
public; endangered by sewer pollution, court decision on, 1213
undergraduate training in, 165
relation of plumbing to, 2079
Hemp; *see* Packing
Heron Bay Townsite, Ont.; water supply and sewage systems of, 1414
Hexametaphosphate; *see* Sodium hexametaphosphate
Hot spring water; fluoride poisoning with, 895

Hot-water systems; cathodic behavior of zinc versus iron in, 1624
corrosion troubles in; 1624
prevention of corrosion in, 1623
safety devices for, 2078
Humic acid; decolorization of water containing, by means of sodium aluminate as precipitating agent, 1424
Hydrants; inspection of, 348
Hydration, lime; fundamental mechanics of, 881
Hydraulic jump; notes on, 1965
Hydrochemistry, reservoir; effect of flooded soils on, 2092
Hydrogen-ion activity; measurement of, 361
Hydrograph, unit; applied to small watersheds, 1059, 2091
Hydrographic Service, Italian; proceedings of fifth conference of, 1058
Hypochlorites; color tests for, 1429

I

India; distribution of fluorosis in, 895
water supply undertakings in, 2086
Industrial wastes; *see* Wastes, industrial
Industry; detection of toxic gases in, 896
factors influencing selection of sites for, in South, 1969
Insulation; optimum thickness of, for Canadian homes, 1420
Insurance; life; for city employees, 165
fire; survey of, 171
Intakes; crib for, at Sandusky, Ohio, 1410
new, for Montreal, 1817
Inventions; rights to, by inventor-employee, 1640
Inventories; desirability of verification of, by independent engineers, 1644
Iodides; determination of, in mineral waters containing bromides and chlorides, 1432
Iodine; in waters and vegetables of Texas, 894
Ion exchangers; *see* Zeolites
Iron; bacteria and fungi, 180
cathodic behavior of, in hot water systems, 359, 1624
industry; waste problems in, 1208
Italy; floods and flood control in rivers of, 1060
hydrographic service in, proceedings of fifth conference of, 1058
water power in, 1066
watershed characteristics of, 1066

J

Joints, cement; various kinds of, for cast-iron pipe, 1809
installing, 348
packing for, new rubber type of, 1629
welded; in structural steel, X-ray control of, 1804
Jujuy, Argentina; water supply and sewage facilities of, 1417
Jute; *see* Packing

K

Kansas City, Mo.; water supply system of, 1411
Kent, Ohio; use of Calgon at, 1216
Keokuk, Iowa; new water works at, 1413

L

Lactose utilization; rate of, by slow lactose-fermenting bacteria, as affected by cultural procedures, 697
Ladybower reservoir; design and construction of, 1046
Lake Constance; currents in, 1047
Lake Maggiore; floods of August, 1939, in, 1061
Lakes; deposits in, 1051
Law; concerning ground waters, 890, 891
decisions on rates, 1222 ff.
industrial waste problem in relation to, 1201
ownership of water according to, 339
Lawrence, Mass.; filtration plant at, 1215, 1216

Lead; brought into solution by some tap waters, 1628
determination of; in food coloring materials, 1430
in small amounts, comparison of different methods for, 1428
pipe; attack on, by acid, alkaline and distilled water, 1622
reinforced, for drinking water supply, 1807
soil corrosion of, 355
poisoning; treatment of, with Vitamin C, 896
significance of, in urine, 895
Leaks; cost of, to taxpayers, 351
detection of, 1811
prevention of, in earth dam, by grouting, 1058
Leipzig; 50 years of water supply in, 2087
Liability; for failure to supply water, 341
for water-borne disease, 166
Liens; against property for water bills, 170
Light; filter plant operation aided by, 1217
production of pigment by certain bacteria, affected by, 698
transmission of; luximeter for measuring, 1803
Lignin; use of, in iron removal, 712
Lime; determination of fluorine in, 880
milk of; factors affecting, in industry, 879
quality of, desired in treatment, 879
symposium on, 879
water works use of, 881
Limnology; of high mountain waters, 1051
studies in Connecticut, 1051
study of Chatauqua Lake, 1971
Lining, sodium carbonate; use of, to prevent seepage losses, 1058
Little Rock, Ark.; laying of asbestos-cement pipe at, 348
Logs, water well; electrical determination of, 887
London Metropolitan Water Board; 1938 annual report of, 2083
London, Ont.; water works system of, 1411
Los Angeles; special water supply problems in, created by boron, 2095
25 years of aqueduct maintenance at, 1817
Louisiana, south central; record rains cause flood in, 2094
Luximeter, photo-electric; use of, for measuring light transmission, 1803

M

Maintenance; aqueduct; 25 years of, at Los Angeles, 1817
meter; economic limits of, 344
pipe line; aided by brackets, 1810
simplification of, by removable well houses, 885
trucks; new features of, 1811
Manganese; determination of; in water and iron, 1433
colorimetric, with periodate, 1433
Manometers; construction of, for measuring flow, 1957
Maryland State Department of Health; 1939 annual report of, 1412
Mechanics; application of, to calcination and hydration of lime, 881
Mercurous perchlorate; *see* Perchlorate, mercurous
Metal; couples; *see* Couples, metal
formaldoxine as color reagent for, 1433
Metaphosphate; *see* Sodium hexametaphosphate
Meter maintenance; economic limits of, 344
Micro-photometric test; application of, to determination of aluminum 1433
Mineral waters; iodide determination in, containing bromide and chloride, 1432
Model; of purification plant, 877
Mount Bold dam; construction of, 1054
Mucoid dissociation; in colon-typhoid-salmonella group, 696
Municipal ownership; combination of utilities under, 1422
fair return in, 1218

Muskegon, Mich.; filtration plant in, treats Lake Michigan water, 1215
Mussels; control of, by chlorination, 1969

N

Narragansett, R. I.; new water system at, 1414
National Resources Committee; work of, on stream pollution abatement, 1212
Natural waters; pH measurement of, 362
Netherlands; provision of potable water in, 2090
Neutralite; use of, in corrosion prevention, 1626
New York City; conservation program in, 1638
shaft sinking on Delaware aqueduct to, 355
supply necessary for, 1413
Nutrient media; determination of quality of, with photo-electric nephelometer, 700

O

Office practice; standardization of, by manuals, 170
Ohio River Pollution Survey; methods and progress of, 1210
Orifices, circular, small; discharge through, 1957
Ownership; legal, of water, 339
Oxygen; dissolved; determination of, 364
measurement of rate of exchange of, between water basin and atmosphere, 2092
Ozone; color tests for, 1429
use of, in treatment, 1632

P

Packing, rubber; replacement of jute and hemp by, in cast-iron pipe at Akron, 1809
Paper industry; waste problem in, 1202, 1211
water problem in, 1968
Particle size; methods of representing distribution of, 1966
Pasadena, Calif.; water control at, 1047
Pensions; plans for, 340
Peptones, bacteriological; preparation of, 697
Perchlorate, mercurous; use of, as a volumetric reagent for chlorides and bromides, 1432
Periodate; use of, in colorimetric determination of manganese, 1433
Petroleum industry; waste problems in, 1207
pH; determination of, in natural waters, 362
determination of, methods for, 1427
resulting from reaction between iron and pure water at room temperature, 1427
selections of feed-pump materials guided by, 708
Photo-electric; method; controlling addition of aluminum sulfate by, 882
nephelometer; determination of quality of nutrient media with, 700
Photographic duplication; records preserved by, 1640
Photomicrography; low cost of, 1805
Physical variables; of algal cycle, changes in, 1050
Physics; in replenishment of ground water, 890
laws of, in treatment, 871
Phytoplankton; changes in, 1056
Pinholes; in galvanized tanks, 1623
Pipe friction; new formula for, 1967
Pitot tubes; effect of flow past, in large pipes, 159
investigation of errors of, 159
Pitting; cause and remedy of, in locomotive tubes and sheets, 704
rapid; causes of, in open galvanized tanks, 1623
Plants; new, and improvements in old, 521 ff., 1408 ff., 2080 ff.
Poisoning; chemical; effects of, resisted by fish in reservoir, 1052
fluoride; hot spring water causes, 895
lead; treatment of, with Vitamin C, 896

Pollution; extract from annual report of Water Pollution Research Board, 877
sewer; endangers health, court decision on, 1213
typhoid outbreak, caused by, 893
suits; time limit for filing of, 1642
Ponds; suggested classification of, based on desmids, 1048
Population; forecasting of, 175
Porous media; flow of liquid through, 1954
Potassium; permanganate; new method of dosing with, 882
titration of, 363
Power, water; development of, 167 in Italy, 1066
Pressure; aqueduct; at Boston, Mass., 354, 355
indicators; for earth dams, 1057
pipe connection; T. E. M. type of, 1806
tunnel; strengthening of, at Sydney, Australia, 353
Pressure-momentum theory; application of, to broad-crested weir, 1958
Pricing, monopoly; in utility rate schedules, 1220
Production costs; effect of rising, on utility investors, 1218
Property records; continuing, maintenance of, 347
Pulp industry; waste problem in, 1202
Pumps, automatic; 72% return earned by, 708
equipment needed to meet today's requirements for, 708
Purification; colloid chemistry in, 883
current tendencies in, 875, 876

R

Radioactivity; of natural mineral waters, use of, in healing, 897
Railway water service; pipe lines for, 351
Rainfall; studies of intensity of, 1063
Rand water board (South Africa); 35th annual report of, 2089
Rangoon, Burma; water supply of, 2089
Rates; valuation of water undertakings for determination of, 1972
reduction of, by commission order, 2091
Reactivation, bone char; new method and apparatus for, 1633
Recirculation; of boiler water, to hot-process softeners, 703
Records; continuing property, maintenance of, 347
photographic duplication of, 1640
Recreation; use of impounding reservoirs and lakes for, 1044
Redistillation; constant level still for, 1801
Repair; *see* Maintenance
Regional grouping; for public water supply, 173, 521
Rennes, France; filter wash in, 1214
Replacement, raw material; in water works practice, 1419
Replenishment; ground water; a factor in calculation of well yield, 886
physical and chemical observations during, 890
Research; on flow of fluids, 162
water supply; new laboratory for, 2085
Reservoirs; hydrochemistry of, effect of flooded soils on, 2092
recreational use of, 1044
Resins, amine; improved manufacture and application of, 714
Rivers; navigable; obstruction of, 1067
right to build dams on, 2090
water mains in beds of, 350
Runoff; analysis of characteristics of, 1061
studies on demonstration projects of, 1062
surface; hydraulics of, 1062
Rural districts; water supply, sewerage, and other public services in, of low rateable value, 1418

S

Sabotage; *see* War
Sacramento, Calif.; duplicate filtration plant in, 1214

Safety devices; for domestic hot-water supply systems, 2078
for water systems, 170
St. Louis; near maximum storm at, 1064
St. Saviour's dam; construction of, 1054
Salivary amylase; effect of fluorides on, 894
Salt River, upper; water supply on, 1065, 1417
Samples; extraction and inoculation of; automatic device for, for bacteriological examination, 1802
Sandusky, Ohio; intake crib and other engineering features at, 1410
Sanitary engineering; *see* Engineering, sanitary
Sanitation; influences of public health work on, 892
relation of water works practice to, 2080
San Jacinto tunnel; driving of, 350
San Leandro; question of opening impounding lake at, to public fishing, 1044
Santa Fe, Calif.; all-welded steel tanks at, 1812
Scarboro (Ont.) Township; extensions and improvements to water works in, 1415
Screw, Archimedes; comment on, 162
Seepage losses; prevention of, by sodium carbonate lining, 1058
Service; denial of, commission ruling on, 171
discontinuation of, commission ruling on, 342
extension of, 169
on railways, 351
Servicing; *see* Maintenance
Settling basins; double-deck, 1214
Sewage treatment; coupled with irrigation, 2096
Sewer pollution; *see* Pollution, sewer
Shaft sinking; on Delaware aqueduct to New York City, 355
Shiga dysentery; outbreak of, in Michigan, 894
Shock pressure; reduction of, 160
Short school; Texas water works and sewage, proceedings of, 1422
Silica; determination of, by silicomolybdate method, 1426
removal of, by sodium aluminate, 878
scales; occurrence and correction in high pressure boilers, 704
Silicomolybdate method; determination of silica by, 1426
Silting, reservoir; reduction of, by erosion control, 1052
Siphon, self-supporting; in long spans 1817
Smelting industry, nonferrous; waste problems in, 1207
Sodium; aluminate; manufacture of, 881
silica removal by, 878
use of, as precipitating agent in decolorization of waters containing humic acid, 1424
hexametaphosphate; corrosion control by, 1623
properties of, 1425
use of, in Ohio, 1216
lauryl sulfate broth; coliform detection by, 609
titration of, 363
Soft waters; theory of, 359
Soil; corrosion by; of lead and copper pipe, 355
protection against, 361
corrosivity of, methods of estimating, 1624
freezing of, new method for, 354
Solids; determination of total dissolved, by electrical conductivity, 1434
resulting from reaction between iron and pure water at room temperature, 1427
Solubility; of calcium bicarbonate, 362
Sound waves; use of, in treatment of liquids containing suspended particles, 1966
S. Brandenburg (Neth.); Tilbury water plant in, 1416
Specials, diagonal flange; use of, for meters, 1634
Spillways; collapsible flash-board pins for, 1057
design of, for future floods, 1061
lateral channels in, 1056

Spring water; healing values of, 897
hot; fluoride poisoning with, 895
Standards; permanent, for chlorine, 178
Statements; consideration of public interest in drawing up, 1646
for investors, 1645
income and surplus; integration of, 1644
Steam; distribution of carbon dioxide between water and, calculation of, 1427
Steel; industry; waste problems in, 1208
pipe, 40 years service of, at Seattle, 1818
reconditioning of, 360
structural; X-ray control of welded joints in, 1804
Sterilization; of slow sand filters, 1217
Still, constant level; use of, for redistillation, 1801
Stirrer, laboratory; for coagulation studies, 1803
Stopper, pressure pipe; T. E. M. type, 1806
Storms; near maximum, at St. Louis, 1064
Stream flow; application of measure of uniformity to, 1062
Sulfate; determination of, by tetrohydroxyquinone method, 1426
economy of, by sun-ray counts, 1970
Super-chlorination; break-point; taste and odor control by, 1631
quality at Sandusky and Norwalk, Ohio, improved by, 1630
taste and odor control by, 180
Supplies; in war-time, 165
liability for failure of, 341
new, and improvements in old, 521 ff., 1408 ff., 2080 ff.
private; within municipal, 888
regional grouping for, 173, 521
rural; in Dumfriesshire, England, 2084
Surge; control of, 1966
Sweden; drought in, 2094
rural water supply and drainage problems in, 2087
Swimming pools; chlorinated; testing water in, 1800
control of algae in, 1971
treatment of water for, 874

T

Tanks; circular concrete; design of, 715
elevated; town hall enclosed in, 1421
galvanized; causes of rapid pitting in, 1623
Tankers; conversion of buses into, 1421
Tannins; types of, used in water treatment, 705
Taxation, public utility; changing incidence of, 1972
Temperature relations; of small bodies of water, present knowledge of, 2091
Testing; aqueduct; steel plate plugs for, 1818
laboratory; work on cross-connections in, 2079
Tetrahydroxyquinone method; determination of sulfate by, 1426
Texas; ground waters of, 889
Water Works and Sewage Short School; proceedings of, 1422
Textile industry; treatment of liquid wastes in, 1206
Thawing; of mains and service pipes, 1810
Thickness, metal wall; measurement of, by electricity, 1804
Titration; of chlorine, 177
of potassium and sodium, 363
Toledo, Ohio; construction features of new water supply at, 1409
design features of new water supply at, 1408
strengthening of conduit at, 353
Tornado hazards; removal of, from Kansas supply, 1421
Toxicity; of basic fuchsin, for certain bacteria, 695
of gases, detection of, in industry, 896
Transfer chamber, sterile; construction of, 1803
Tunnel, pressure; strengthening of, at Sydney, Australia, 353

Turbidity; determination of, in fairly clear water, 1801
treatment of, by use of sound and ultra-sound waves, 1966
Turbulence; effect of, on erosion and corrosion, 1964
relation of statistical theory of, to hydraulics, 164, 1960
Typhoid; Croydon epidemic, 893
in England, 893
outbreak of, caused by sewer pollution, 893

U

Ultra-sound waves; turbidity treatment by, 1966
Ultra-violet rays; energy of, in daylight, 4-year record of, 1970
lethal action of, 179
Underdrains; for gravity filters, 1217
Uniformity, measure of, as applied to daily stream flows, 1062
Unit-head-loss method; application of, to artesian wells, 1964
U. S. Public Health Service; bacteriological investigations of, 892
Utilities; changing incidence in taxation of, 1972
outlook for, in 1940, 342
relative value of, 171

V

V. cholerae; growth and survival of, in water, 700
Valuation; of water undertakings for rating purposes, 1972
recent developments in, 1219
relative, of utility systems, 171, 1641
Venetian rivers; floods and flood control in, 1060
Venezuela; water works development in, 1417
Visitors, filtration plant; handling of, 341
Vitamin C; use of, in treatment of lead poisoning, 896
Volumetric method; determination of sulfuric acid by, as used for water with varying hardness, 1428
reagent; mercurous perchlorate as, for chlorides and bromides, 1432

W

War; danger of sabotage in public service departments, 1636
effect of, on water companies, 342
luminescence in water plants during black-outs, 339
protection of water plants against poison gases, 166
water supply in, 165
Wastes; industrial; in chemical industry, 1204
in fermentation industry, 1203
in iron and steel industries, 1208
in nonferrous smelting industry, 1207
in petroleum industry, 1207
in pulp and paper industry, 1202, 1211
in textile industry, 1206
legal aspects of, 1201
problem of, 1201
treated by biological processes, 1205
viewpoint of equipment manufacturer on, 1204
water; cost of, 351
detection of, 351
reduction of, by meters and repair, 1635
Water; legal ownership of, 339
Water hammer; analysis of, in pumping plant, 163
preventive measures against, 161
Water Pollution Research Board; annual report of, 1938–39, 1211
work of, 1211
Water works practice; in Britain, 2082
raw material economy in, 1419
relation of, to sanitation, 2080
useful information on, 1419
Watersheds; characteristics of, in Italy, 1066
small; probable maximum flood flow on, 1064
unit hydrograph principle applied to, 1059
upland; economic aspects of, in western U. S., 1067

Weirs; broad-crested; application of pressure momentum theory to, 1958
submerged; verification of formula for, 162
transverse slope of crest causes error in discharge measurement of, 1958
V-notch; discharge of, at low heads, 1957
Wells, artesian; hydraulics of, by unit-head-loss method, 1964
concrete clear; construction of, 351
houses for, simplify maintenance, 885
Wire, steel; use of, in reinforced concrete, 716

X

X-rays; control of welded joints in structural steel by, 1804

Y

Yield; of wells, calculation of, 886

Z

Zeolites; America's largest plant, 711
use of, in treating water for dyeing, 1424, 1968
Zerhyd process; softening with "Allassions" by, 709
Zinc; cathodic behavior of, in hot-water systems, 359, 1624

Authors of Abstracted Articles

Abbiati, F. A., 881
Acree, S. F., 361
Adams, E. G., 1644
Akin, G. A., 703
Alexander, L. J., 872, 1631
Allan, W. D. M., 717
Amberg, E. J., 896
Amorosi, A. M., 1427
Andren, S.-G., 179
Andrews, A. I., 180
Anton, H., 1800
Armistead, H. G., Jr., 1063
Arnold, G. E., 529
Arredi, F., 162
Atkinson, G. F., 1046
Atwood, A. W., 172
Auerbach, I. M., 1047
Austen, W., 890
Austin, J. B., 1966
Ayres, L. P., 1636
Azbe, V. J., 881

Babbitt, J. D., 1420
Bachmann, E. E. J., 1432
Bacigalupi, J., 873
Bahlman, C., 1630
Baity, H. G., 1212
Baker, D. M., 891
Baker, J. A., 698
Baker, M. N., 532
Bakhmeteff, B. A., 1960, 1963
Barbeito, A. L. A., 1806
Barker, C. L., 1958
Barnes, G. E., 1951
Barnett, M. R., 1953
Bartell, F. E., 536
Bartells, G. C., 1623, 1623
Bartlett, J. K., 1064
Bartow, E., 362, 1423
Batta, G., 359
Baty, J. B., 1631, 1969
Baudisch, O., 897
Baxter, G., 875
Bearden, J. F., 527
Becker, W. A., 1971
Beckwith, T. D., 696
Behrman, A. S., 1434
Beitler, S. R., 162
Bere, R., 1971
Bergey, D. H., 701
Bermel, K. J., 2093
Berry, A. E., 2080
Besozzi, L., 531
Betts, C. A., 1960
Bfeiffer, B., 2087
Bier, P. J., 1817
Bihet, O. L., 1627
Black, A. P., 362
Blaisdell, F. W., 1957
Block, N. B., 894
Bockelberg, V., 179
Boeringsfeld, H. A., 1958
Boothman, A., 1810
Borman, E. K., 694
Boruff, C. S., 1203
Bose, S., 700
Bowman, J., 2082
Brallier, P. S., 177
Branch, L. V., 528
Brandt, O., 1966
Brayman, H., 1637
Breed, R. S., 701
Breihan, E. R., 1063
Brend, W. R., 1816
Brett, F. J., 345
Brewer, D., 894
Brode, K. L., 1421
Brous, S. L., 361
Browne, A. W., Jr., 361
Browning, C. F., 540
Bruce, H. T., 530
Bruevich, S. V., 536
Bruk, E. S., 2092
Buch, J. A., 161
Buchwald, H., 1424
Buffington, C. W., 705
Bullard, J. E., 1636
Burke, M., 2093
Burkhead, J. V., 1972
Burkholder, J. L., 352
Bushway, W. B., 349
Buswell, A. M., 1205

Callan, T., 1430
Camo, T. R., 1056
Campbell, G. W., 1805
Campbell, K., 896
Carpenter, L. V., 704
Carriere, J. E., 1628
Carson, W. L., 1803
Chase, E. S., 1216
Churchill, H. V., 1969
Churchill, M. A., 1964
Clader, W. A., 347
Clark, C. M., 1413
Clark, O. E., 1409
Clark, S. C., 1626
Classen, A. G., 1809

CLEARY, E. J., 878
CLEMENT, A. E., 878
CLIFFORD, S. G., 1430
CLUTE, E., 1812
COATES, J. J., 704
COGGESHALL, F. J., 1414
COLBERT, A. R., 345
COLBURN, L. T., 532
COLE, E. SHAW, 159
COLE, EDW. S., 159
COLE, I. G. M., 714
COREY, R. C., 1427
COSTLEY, J. J., 1422
COUGHLAN, R. E., 704
COVENTRY, F. L., 877
COWLES, P. B., 701
COX, C. R., 873
COX, G. N., 162
CRAPPER, E., 706
CREAGER, W. P., 1061
CROSBY, I. B., 1055
CSABAY, J., 1429
CURTIS, D. D., 1960
CUSHING, R. E., 178

DANET, R., 536
DAUGHERTY, T. H., 702
DAVENPORT, R. W., 2093
DAVEY, W. B., 1431
DAVIES, D. G., 1053
DAWSON, F. M., 2078
DAXELHOFER, M., 354
DECHANT, F. H., 1632
DEGRAFF, J. A., 1807
DEGREMONT, G., 1626
DEMIDOV, L. G., 1807
DEMIKHOVSKII, E. I., 700
DES BAILLETS, C. J., 1817
DESCROIX, L., 180, 1812
DE SIMONE, D., 716
DETWEILER, J. C., 1811
DICK, R., 2077
DIEMER, R. B., 352
DORE, S. M., 1818
DOVE, R. E., 351
DRACHEV, S. M., 2092
DREHER, E. F., 874
DUNBAR, W., 1217
DUTTON, M. S., 1634

EDMUNDS, F. H., 888
EDWARDS, E. T., 1971
ELLIS, R. H., 1951
ENGEL, F. V. A. E., 1953
ESSEX, E. H., 1954
EVANS, U. R., 1627

FAHEY, J. J., 1431
FAIRHALL, L. T., 895
FARNSWORTH, S. T., 353
FELLOWS, C. H., 703
FERGUSON, W., 894
FERRAMOLA, R., 1802
FICK, E. A., 339
FIELD, J. E., 1057
FINNEGAN, T. J., 1427
FIPPIN, E. O., 880
FITZPATRICK, E., 882
FOLSOM, M. B., 340
FOLWELL, J. H., 160
FOOTE, H. B., 178
FOOTE, H. W., 535
FOSTER, M. D., 889
FRANQUIN, J., 359, 361, 877
FRAPS, G. S., 894
FRENCH, A. E., 1634
FRESENIUS, R., 363
FREVELL, L. K., 534
FRITSCH, V., 887
FROHNE, W. C., 1048
FUDGE, J. F., 894
FUNKQUIST, P., 178

GANNET, F., 1413
GARDNER, H. S., 160
GARRISON, W. L., 1413
GAYTON, L. D., 1213, 1214
GEORGE, C. H., 1810
GERMAIN, V., 1638, 1638
GHEN, M. W., 1625
GIAUQUE, W. F., 1429
GILLETTE, H. P., 1064
GIRAND, J., 1065
GIRARD, R., 529
GLACE, I. M., 540
GLENDINNING, P. B., 1045
GOBEL, 360
GODSHALL, J. B., 708
GOLUBEVA, M. T., 1424
GOTTING, H., 161, 1419
GOUDEY, R. F., 1970
GRAF, A. V., 881
GRIESSBACH, 1424
GRIFFIN, A. E., 175, 176, 1630
GRIFFIN, A. M., 696
GRIFFIN, K. M., 539
GROESBECK, E. C., 1628
GROFF, G., 1210
GROSS, D. D., 351, 1635
GROVES, W. W., 714
GUMENSKY, D. B., 352, 715
GUSTAFSON, H., 1434

HAASE, L. W., 360, 1624
HACHEZ, 522
HACKNEY, J. W., 1959
HAENDLER, H. M., 535
HAILER, E., 179
HAJNA, A. A., 695
HALL, G. A., 1630

ABSTRACT AUTHORS

HALL, G. L., 1412
HALL, R. E., 702, 880, 1425
HALLINAN, F. J., 177
HAMER, W. J., 361
HAMILTON, B. L., 360
HAMILTON, M., 1811
HAMILTON, W. S., 161
HANAWALT, J. D., 534
HANLEY, J. P., 886
HANNEMANN, O., 1625
HANSEN, P., 1408, 1966
HARLOW, I. F., 1204
HATCH, G. B., 1425
HATCH, H. H., 1057
HAYDOCK, C., 342
HEALY, P., JR., 168
HECHMER, C. A., 170
HEDBERG, J., 1960
HEIMAN, H. O., 1217
HELLER, E., 1633
HENRY, R. W., 1969
HERISSAY, J., 1812
HERRMANN, P., 362
HERSHEY, A. D., 697
HESS, S. G., 537
HIDDEMANN, K., 1635
HIEDEMANN, E., 1966
HIGHLAND, S. G., 711
HILL, J. B., 1207
HILL, J. O., 1635
HINDS, J., 352
HINNIE, W. J. E., 2086
HIRSCH, A. A., 1801
HITCHENS, A. P., 701
HITCHNER, E. R., 697
HODGE, W. W., 1208
HOEFLE, K. F., 1811
HOLLER, E., 888
HOLMES, H. N., 896
HOLMQUIST, C. A., 538
HOLZMAN, B., 1067
HOOVER, C. P., 879, 1216
HOOVER, C. R., 1206
HOPKINS, E. S., 1423
HORNER, W. W., 1063, 1064
HOTCHKISS, H. T., JR., 1217
HOWARD, N. J., 876, 1637
HUBARD, S. S., 362
HUBBARD, C. W., 159, 1962
HUPP, E. R., 699
HYDE, C. G., 1044

INGLESE, V. L., 1806
IYER, P. V. S., 699

JACKSON, I. E., JR., 1221
JACOBSON, R. D., 1432
JACONO, L., 162
JEMING, J., 1643
JENNINGS, J., 161
JOHNSON, D. W., 1811
JUDAY, C., 1426

KAHLER, H. L., 1426
KALINSKE, A. A., 164, 1960, 1964, 2078
KAREL'SKAYA, T. K., 2092
KARPINOS, B. D., 175
KAZMANN, R. G., 1059
KEAN, O., 894
KEIR, F., 2084
KELLER, J. C., 882
KENDALL, T. R., 1214, 1215
KENNISON, K. R., 354
KENWORTHY, L., 1624
KERR, G. P., 1970
KEY, T. B., 884
KHALAPSINA, E. V., 363
KIELANOWSKI, T., 361
KING, R. E., 710
KLASSEN, C. W., 540
KLEGERMAN, M. H., 349
KLINGMAN, F. W., 1803
KLUMPP, J. B., 1632
KNOWLES, C. L., 1204
KNUDSON, H. W., 1426
KOEHLER, C. J., 880
KOENIG, E. A., 1624
KOHLHAPP, C. E., 1643
KOLB, J. J., 535
KOOIJMANS, J., 1629
KOOIJMANS, L. H. L., 1808
KOOYMANS, L., 1628
KOSTROMINA, A. A., 536
KRAMER, W. A., 881
KRASAUSKAS, J. W. M., 700
KRIMGOLD, D. B., 1062
KROEGER, H., 1064
KROHNKE, O., 358, 1623
KRUL, W. F. J. M., 1416, 2090
KUHNE, W., 1633
KUHR, C. A. H. V. W., 355
KURATA, T., 894
KURZ, O., 167

LABRUM, J. H., 1221
LACKEY, J. B., 541
LADUE, W. R., 1629, 1809
LAMARRE, R. J., 1217
LAMBERT, C. F., 171, 1641
LASH, A. W., 1414
LEA, F. M., 717
LEADBETTER, B. C., 352
LECLERC, E., 359
LEIFSON, E., 697
LEITCH, R. D., 1807
LEVERIN, H. A., 1967, 1968
LEVINE, M., 712
LEWIS, J. W., 1055
LINDQUIST, E. G. W., 1954

LINDSAY, F. K., 878
LITTLETON, A. C., 1644
LLOYD, D., 1062
LLOYD, J. M., 1631
LLOYD, L. E., 536
LOANGDON, P. E., 1966
LOGAN, K. H., 1624
LONG, L., 1808
LOOYEN, A., 363
LORING, A. D., 1957
LOWE, H., 1800
LOWER, J. R., 1630
LUCKIESH, M., 1970
LUNDQUIST, E., 1804
LYNCH, D. F. J., 712

MACARA, T., 1430
MACDOWELL, R. F., 711
MACHLE, W., 895
MACKENZIE, E. F. W., 2083
MACRAE, C. F., 1644
MADDALENA, L., 1056
MAGUIRE, J. J., 703
MAMET, A. P., 363
MANAHAN, P., 527
MANLEY, M., 706
MARECAUX, P., 359
MARKWITH, R. H., 1408, 1639
MARSHALL, L. A., 1629, 1803
MARTZ, H. R., 347
MASON, H. C., 698
MASON, M. A., 1962
MASTERMAN, A. T., 176, 1429
MATHESON, D. H., 883
MATHEWS, L. R., 1213
MATTHEWS, S. P., 351
MATUBARA, T., 1622
MAXWELL, W. H., 529
MAY, D. R., 1057
MAY, G. O., 1219
MAYO, L. A., 1634
MAYROSE, W., 1638
MCADAMS, W. H., 703
MCBRIAN, R., 705
MCCANN, D. C., 887
MCCLURE, F. J., 894
MCCORMICK, F. J., 715
MCCRUMB, F. R., 1427
MCDERMIT, J. R., 1427
MCDIARMID, F. J., 1218
MCEWEN, G. F., 1418
MCINTYRE, F. J., 1971
MCKINNEY, D. S., 1965
MCLAUGHLIN, P. L., 1215
MCNOWN, J. S., 1962
MEHLIG, J. P., 1433
MELOCHE, V. W., 1426
MERLA, G., 1061
MERRITHEW, E. A., 351
MERTENS, H. F., 1813
MEYER, O. H., 1062
MICKLE, F. L., 694
MILEY, M. J., 1646
MILIANI, L., 1060
MILLAR, R. S., 877
MILLER, A. P., 165
MILTON, M. V., 706
MINSHALL, N. E., 1062
MOHAUPT, R., 169
MOINE, M., 892
MOLIN, A., 2087
MONCHOW, H. C., 1637
MONSARRAT, G., 521
MONTANARI, G., 2098
MOON, D. G., 1969
MOORE, W. A., 364
MORGAN, H. R., 696
MORTENSON, W. P., 1641
MORTIMER, C. H., 1050, 1051
MOVSHITS, L. E., 363
MUCKLESTON, H. B., 715
MULLER, E., 1432
MUNDT, J. O., 697
MURRAY, E. G. D., 701
MYOTT, E. B., 350

NAUMANN, E., 712, 871
NELSON, G. H., 712
NEMENYI, P., 1963
NETZER, B. N., 1963
NEUFELD, F., 701
NEUMULLER, F., 363
NEUSTRUEVA, M. V., 1428
NEWSOM, R., 168
NORDGREN, G., 178
NUTTER, B. E., 716

O., R. H., 1433
O'BRIEN, G. L., 176
O'CONNOR, P. J., 1971
ODEND'HAL, C. J., 1964
OEXLE, L., 1060
OHLE, W., 536
O'NEIL, A. D., 706
OOSTERHOLT, C. J., 180
ORCHARD, W. J., 1631
OXENHAM, J. R., 1418

PAGLIARO, F., 1056
PARKER, L. T., 339, 341, 538, 1639, 1642
PARR, L. W., 693
PARTRIDGE, E. P., 702, 880
PEABODY, R. M., 163
PEIRCE, W. M., 1623, 1623
PENFIELD, W., 178
PEREYRA, C. J., 1433
PERKINS, F. A., 2079
PERLEY, G. A., 364
PERRY, C. A., 695

Pertini, F. C. T., 1432
Petre, M. F., 1417
Pfeiffer, J. P., 360
Pfiffner, T. G., 1064
Pichler, W., 2091
Pierce, J. F., 170
Placak, O. R., 364
Plummer, H. C., 1417
Potter, A., 349
Powell, S. T., 704
Powell, T. M., 1429
Prentice, T. H., 1959
Price, R. L., 353
Proctor, E. M., 1415
Pugh, N. J., 533
Pugh, W., 1432
Pugsley, A. J., 2092
Puri, A. N., 1058

Raghavachari, T. N. S., 699
Ramshorn, A., 1419
Rattray, W., 346
Read, W. D. B., 700
Reisner, H., 887
Reith, J. F., 363
Rempel, H. G., 1430
Rentschler, M. J., 544
Rhodes, L. S., 1967
Rice, E. W., 1633
Rice, O., 880, 1425, 1623
Richter, 1424, 1968
Ridenour, G. M., 544
Riehl, N., 339
Riley, G. A., 1051
Riley, R. H., 1218
Rinn, H. W., 534
Ritter, C., 695
Robertson, R., 1211
Robinson, H. M., 1641
Rodenburg, J., 180
Roe, A. F., 1803
Rohwer, C., 1960
Ronald, D., 1217
Rosenber, M., 1050
Rouse, H., 1961
Rowland, G. P., Jr., 533
Roy, H. L., 1957
Ruchhoft, C. C., 364
Ryon, H., 160
Ryznar, J. W., 878

S., R., 2094
Sahib, R., 699
Salter, G. S., 715
Samuel, T. D., Jr., 1411
Sattler, G., 1809
Saunderson, M. H., 1067
Sayers, R. R., 895
Schiemann, O., 701
Schikorr, G., 359, 1624
Schmidt, L., 886
Schoenfeld, F. K., 361
Schoepfle, O. F., 1410
Scholler, H., 1427
Schroeder, W. C., 707
Schumacher, A., 713
Scobey, F. C., 1965
Scofield, C. R., 2094
Scott, E. W., 895
Scott, R. D., 178
Sen-Gupta, N. K., 1957
Seniff, R. W., 706
Sharp, D. G., 179
Shaw, A. L., 1216
Sherman, C. W., 1811
Sherman, L. K., 1059, 1062
Shulits, S., 1963
Shvedov, V. P., 1430
Siebert, C. L., 1211
Sigworth, E. A., 883
Sinclair, F. K., 709
Singh, G., 700
Skinner, H. J., 1202
Skopintsev, B. A., 1424
Slavin, M., 533
Smith, F. E., 341
Smith, H. V., 1431
Smith, L. A., 1419
Smith, O. M., 710
Smith, W. E., 1059
Snelling, H. H., 1640
Snyder, F. P., 2091
Sokoloff, W. P., 1802
Sopp, C. W., 1047
Sourochknioff, B., 715
Splittgerber, A., 1423
Sreggwentz, J. H., 886
Stanisavlievici, L., 2089
Stefanon, R., 2096
Steinbock, O., 1051
Sterpin, F., 1968
Sterrett, E., 1810
Stevens, J. C., 1959, 1962
Stewart, H. I., 1064
Stimmel, R. M., 704, 705
Stipp, A. C., 891
Stockton, R. S., 2094
Storrie, W., 2080
Straub, F. G., 705
Streck, A., 1065
Streeter, H. W., 1210
Strickler, H. S., 1801
Strong, J. I., 1046
Stuart, C. A., 694, 696
Stump, W., 1432
Sugawa, Y., 895
Sullivan, E. J., 2079
Swain, R. E., 1207
Swinnerton, H. H., 528
Sydow, W., 711

TANAY, I., 1429
TAYLOR, A., 350
TAYLOR, A. H., 1970
TAYLOR, C. B., 1050
TAYLOR, D. R., 344
TAYLOR, F. S., 1971
TAYLOR, H. G., 1621
TENGCO, R., 362
TERES, J., 1622
THAYER, S., 1626
THOMAS, H. A., 161
THOMPSON, J. B. L., 894
THOMPSON, J. G., 881
THOMPSON, R. H., 1818
THOMPSON, T. G., 535
THOMPSON, W. R., 177
THORNTHWAITE, C. W., 1067
THORNTON, B. M., 1804
THORNTON, W. M., 1804
TISDALE, E. S., 1210
TOBEY, J. A., 1201
TOLMAN, C. F., 891
TOMLINSON, W. J., 703
TREGL, J., 1428
TREON, J., 895
TRESSLER, W. L., 1971
TRONSTAD, L., 1619
TROXEL, C. E., 1220

VAINSHTEIN, G. I., 882
VALENZUELA, L., 1951
VANDERZEE, M. H., 528
VAN NES, B. A., 886
VAUBEL, E. A., 884
VEATCH, F. M., 2096
VERAIN, M., 361
VIEMO, R., 1619
VIGNEROT, 173
VINBERG, G., 2092

WAGENAAR, G. H., 1433
WALDEN, M. P., 708
WALKER, H. H., 692
WALTON, R., 884
WARD, R. E., 1422
WARD, W. R., 1972
WASHBURN, D. E., 879
WASSER, O., 527, 875
WATTENBERG, H., 534
WEAVER, S. M., 170, 348
WEBER, H. C., 1432
WEBER, J. L., 1062
WECKEL, K. G., 1968
WEINBERGER, J. M., 1803
WEIR, W. W., 2094
WELCH, F. X., 342
WERNTZ, W. W., 1645
WESTON, R. S., 1201
WHITE, J. H., 1057
WHITMORE, M. R., 1622
WILM, H. G., 1959
WILSON, D. A., 1801
WILSON, D. C., 895
WILSON, J. H., 1628
WILSON, W. E., 1958
WINSLOW, C. E. A., 692
WITTMER, J. J., 167
WOLPERT, N. M., 529
WOOD, D. M., 1417
WOOD, W. J., 2093
WORTHINGTON, E. B., 1050
WRIGHT, C. A., 1960
WYLLIE, J., 1804

YOCHEM, F., 707
YODER, J. D., 710
YOUNG, O. H., 1216

ZNAMESKII, N. I., 1807